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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,505	10/30/2003	Yasuo Takebe	61352-046	5764
<div>7590 06/05/2007 MCDERMOTT, WILL &amp; EMERY 600 13th Street, N.W. Washington, DC 20005-3096</div>			<div>EXAMINER ALEJANDRO, RAYMOND</div>	
			<div>ART UNIT 1745</div>	<div>PAPER NUMBER</div>
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/696,505

Applicant(s)

TAKEBE ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-79, 82-108 is/are pending in the application.
- 4a) Of the above claim(s) 1-79 and 82-106 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 107-108 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/23/07 has been entered.

The following Examiner's correspondence responds to the amendment in connection with the filing of the above-identified RCE. None of the previously stated grounds of rejection have been overcome. Refer to the abovementioned amendment for substance of applicant's rebuttal arguments and remarks. Therefore, the instant claims are again rejected over the same art as set forth hereunder. In addition, two new grounds of rejection under Section 103 in combination with the previous rejections have been added to further address applicant's contention. The present application is being rejected for the reasons of record

### ***Election/Restrictions and Claim Disposition***

1. Claims 1-79 and 82-106 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 08/21/06.
2. Claims 80-81 have been cancelled.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 107 is rejected under 35 U.S.C. 102(b) as being anticipated by Fuller et al 6068941.

**Figure 1** illustrates a fuel cell comprising an anode section 10-12, a cathode section 18-20, an electrolyte membrane 8, and flow field plates 2, 2' (Col 2, lines 10-25/Figure 1); and air line 32 for feeding air (Col 2, lines 38-41) and fuel line 24 for feeding fuel (COL 2, lines 30-35).

Fuller et al disclose a method of operating a fuel cell system having a cathode catalyst, and a cathode reactant flow field comprising: upon shut-down of the fuel cell, introducing a low molecular weight alcohol into the water circulating loop, and at the beginning of a start-up sequence introducing a limited flow of oxidant into said cathode reactant flow field to combust the methanol (CLAIM 5). Fuller et al disclose a proton exchange membrane fuel cell having a methanol or ethanol fed (*hydrocarbon based material*) fed into the coolant passages during shut-down, and that upon start-up, a controlled amount of air is fed through the cathode reactant flow field so that alcohol diffusing to the cathode catalyst is oxidized (ABSTRACT/ COL 1, lines 4-12/ CLAIM 5). *Note that methanol/ethanol are hydrocarbon-based material which are highly volatile. Further note that Fuller et al disclose that alcohol diffuses to the cathode catalyst. Still further note that the alcohol is introduced into the fuel cell upon shutdown thereof. Therefore,*

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*there is a presence of such a hydrocarbon-based material in the cathode upon shutdown of the fuel cell, and thus, restoring operation to decrease cathode potential necessarily occurs.*

*Alternatively, Fuller et al also encompass start-up of fuel cell, notice also that start-up takes place after a shutdown operation. Thus, there is also a hydrocarbon-based material in the cathode "after terminating operation of the fuel cell".*

Accordingly, the present claim is fully anticipated.

#### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

#### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 108 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Dine et al 2002/0098393.

Dine et al disclose a procedure for shutting down an operating fuel cell system that recirculates a portion of the anode exhaust in a recycle loop, such a procedure includes disconnecting the primary load from the external circuit, stopping the flow of air to the cathode, and applying an auxiliary resistive load across the cells to reduce and/or limit the cell voltage and reduce the cathode potential while the fuel is still flowing to the anode and the anode exhaust is recirculating (ABSTRACT/ P0035-0037/ CLAIMS 1 & 7).

*(Emphasis supplied→) Dine et al also disclose that upon an uncontrolled shut-down some of the residual hydrogen and some of the oxygen in their respective anode/cathode flow fields diffuse across the PEM (each to the opposite side of the cell) and react on the catalyst to form water (P0009). Thus, this implies that the cathode receives water after terminating operation of the fuel cell, and thus, the restoring operation inherently takes place at the cathode. Therefore, reduction of cathode potential does occur to certain degree.*

Fuel cell system of Dine et al comprises a fuel cell 102 comprising an anode 104, a cathode 106, and an electrolyte layer 108 disposed between the anode and cathode (P0027); and a cathode flow field plate 120 and an anode flow field plate 118 for carrying respective reactants (oxidant/air and hydrogen-containing fuel (P0027-0028).

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*A 35 U.S.C. 102 /103 combination rejection is permitted if it is unclear if the reference teaches the range with "sufficient specificity." Ex parte Lee, 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993) (expanded Board). See MPEP 2131.03 [R-5] Anticipation of Ranges.*

A REJECTION UNDER 35 U.S.C. 102/103 CAN BE MADE WHEN THE PRIOR ART PRODUCT SEEMS TO BE IDENTICAL EXCEPT THAT THE PRIOR ART IS SILENT AS TO AN INHERENT CHARACTERISTIC. In re Best, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA1977).

*"[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)). See MPEP 2112 [R-3] Requirements of Rejection Based on Inherency; Burden of Proof.*

9. Claim 108 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ueno et al 2001/0001287.

Ueno et al disclose a fuel cell power generating apparatus 1 using a stack 2 of a plurality of fuel cell units U each having a structure comprising a cathode 3 (ABSTRACT/FIGURES 1-2), an anode 4 and an electrolyte membrane 5 and having a fuel gas supply system 10 that supplies

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fuel to the anode and an air supply system 40 that supplies air to the cathode (ABSTRACT/ FIGURES 1-2). Separators 6 are disclosed (P0002/0032/FIGURE 2).

The fuel cell system of Ueno et al includes a water supply system 50 that supplies liquid water to the surface of the cathode (ABSTRACT/ CLAIM 1/P0013). Ueno et al disclose that when the fuel cell system is to be stopped, the first gas supplying means (the fuel), then the fuel gas discharge means and then said liquid water supplying means are stopped in this order (P0022). *It is noted that once the fuel gas discharge means is closed, normal operation of the fuel cell commences to cease, thereby a shutdown operation starts to take place. Therefore, Ueno et al implicitly disclose to supply water to the cathode after stoppage of normal operation of the fuel cell. Accordingly, water is supplied after the fuel gas supplying means is closed, and the restoring operation to reduce cathode potential does occur. Therefore, reduction of cathode potential does occur to certain degree.*

*Alternatively, Ueno et al also encompass start-up of fuel cell (P0014), notice also that start-up takes place after a shutdown operation. Thus, there is water in the cathode "after terminating operation of the fuel cell".*

*A 35 U.S.C. 102 /103 combination rejection is permitted if it is unclear if the reference teaches the range with "sufficient specificity." Ex parte Lee, 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993) (expanded Board). See MPEP 2131.03 [R-5] Anticipation of Ranges.*

A REJECTION UNDER 35 U.S.C. 102/103 CAN BE MADE WHEN THE PRIOR ART PRODUCT SEEMS TO BE IDENTICAL EXCEPT THAT THE PRIOR ART IS SILENT AS TO AN INHERENT CHARACTERISTIC. In re Best, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA1977).



*“[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency’ under 35 U.S.C. 102, on prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)). See MPEP 2112 [R-3] Requirements of Rejection Based on Inherency; Burden of Proof.*

#### ***Response to Arguments***

10. Applicant's arguments filed 05/23/07 have been fully considered but they are not persuasive.

11. **With respect to Fuller et al’941:** applicant has raised the issue that “*methanol and an ethanol are not hydrocarbons*” because they “*have hydroxyl group which contains oxygen in addition to hydrogen and carbon*” and that “*hydrocarbons are organic compounds consisting exclusively of the elements hydrogen and carbon (see, page 612, Hawley’s Condensed Chemical Dictionary, 12<sup>th</sup> Ed.)*”. In reply, the examiner simply points out that the present claims call for “*a hydrocarbon*” substance (i.e. gas) and that as per Merriam-Webster’s Collegiate Dictionary (10<sup>th</sup> Edition) an alcohol is a compound that has hydroxyl derivatives of hydrocarbons. Therefore, the ethanol or methanol of Fuller et al’941 is a hydrocarbon-based or hydrocarbon-derived material, and as such it reads on applicant’s broad hydrocarbon substance. The examiner understands applicant’s contention but does not fully agree with the interpretation given to the term

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“hydrocarbon” in view of its broad recitation and/or all-encompassing extension. In the Examiner’s opinion nothing in the present claims fully excludes hydrocarbon-based or hydrocarbon derived materials.

With respect to applicant’s contention that “*claim 107 recites supplying a hydrocarbon gas to the cathode*”. *Methanol and ethanol, while volatile, are both liquids at room temperature*”. There is no dispute that methanol and ethanol are both liquids at room temperature. However, during operation of fuel cell as instantly claimed, the energy produced raises the temperature of the cell, wherein the temperature of the cell reaches approximately 65 °C (150 °F) (See Col 3, lines 18-23 of Fuller et al’941). Unquestionably, Fuller et al’s941 fuel cell is operated at a temperature higher than room temperature. Thus, unless applicant is able to demonstrate normal operability of his fuel cell at room temperature, and amends the claim to include said temperature, the present claim remains rejected in view of Fuller et al’941 because the operating temperature of Fuller et al’941 is at least 65 °C (150 °F) or more, thereby making it possible to evaporate high volatile substances such as methanol and/or ethanol.

In response to applicant's argument that the references fail to show certain features of applicant’s invention, it is noted that the features upon which applicant relies (i.e., *room temperature*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

12. **Regarding Ueno et al’287:** applicant has commented that “*Ueno fails to disclose the degree to which the potential of the cathode is decreased after shutting down fuel cell operation*”. In reply, (as best understood by the Examiner) the crux here is not that Ueno et

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al'287 does not at all disclose decreasing the potential of the cathode but that "*Ueno et al'287 fails to disclose the degree to which the potential of the cathode is decreased*" (See applicant's arguments paragraph bridging pages 27-28). A careful consideration of applicant's approach to overcome the reference implies that applicant does agree that Ueno et al'287 discloses certain degree to which cathode potential is reduced but apparently not the claimed degree (i.e. +0.1V to +0.4V). However, since PTO does not have proper equipment to carry out respective analytical or potential test(s), the burden is shifted to the applicant to demonstrate that the prior art does not exhibit the cathode potential reduction as instantly claimed. In short, applicant is requisitioned to show that his invention is neither anticipated nor rendered obvious by this reference.

*A 35 U.S.C. 102 /103 combination rejection is permitted if it is unclear if the reference teaches the range with "sufficient specificity." Ex parte Lee, 31 USPQ2d 1105 (Bd. Pat. App. & Inter. 1993) (expanded Board). See MPEP 2131.03 [R-5] Anticipation of Ranges.*

A REJECTION UNDER 35 U.S.C. 102/103 CAN BE MADE WHEN THE PRIOR ART PRODUCT SEEMS TO BE IDENTICAL EXCEPT THAT THE PRIOR ART IS SILENT AS TO AN INHERENT CHARACTERISTIC. In re Best, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA1977).

*"[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d*

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1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)). See **MPEP 2112 [R-3] Requirements of Rejection Based on Inherency; Burden of Proof.**

In response to applicant's argument that "the decrease in a potential of the cathode results in an advantage due to oxidation of the catalyst and adsorption of contaminants can be resolved", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See Ex parte Obiaya, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

13. As far as Dine et al'393: applicant has articulated that "*Dine does not disclose the step of carrying out a restoration operation by supplying water to the cathode after terminating operation of the fuel cell*" because "*it cannot be said that water is supplied to the cathode*" as "*hydrogen and oxygen do not become water until after the gases have been supplied to the cathode and have reacted on the catalyst*", and "*recirculation (of hydrogen) is continued until substantially all the hydrogen is removed. The cell may be then completely shut down*". "*Thus, Dine discloses that the shut down of the cell (i.e. termination of operation of the fuel cell) is not finished until the hydrogen and oxygen is supplied to the cathode*". In reply, applicant deserves much credit for going to a great length to explain why Dine et al'393 does not anticipate his invention. However, being overlooked is the fact that Dine et al'393 discloses that "*The recirculation is continued until substantially all the hydrogen is removed. Then, the cell may then be completely shut-down*" (See Abstract of Dine et al'393). The phrase "*completely shut down*" here is construed as to shutting down the fuel cell totally, entirely or finally after **all** the hydrogen is removed. Nonetheless, the operation immediately preceding "the complete shut-down" or

“before all hydrogen is removed” can be interpreted as “a partial shut-down” of the fuel cell or “partly/partially shutting-down” the fuel cell before all the hydrogen is removed. So far, applicant’s degree of terminating operation of his fuel cell is completely unknown or undefined in the present claims. For that reason, the partial shut-down of Dine et al’393’s fuel cell still reads on applicant’s undefined degree of terminating operation of fuel cell and does provide certain level of cathode potential reduction while partially shutting-down the fuel cell.

*(Emphasis Added→)* In further support of this position, it is to be noted that the disclosure of Dine et al’393 does imply that shutting-down or terminating operations of a fuel cell can occur either: a) instantaneously, or b) by a shut-down or termination encompassing different fuel cell operating levels or stages before final or total shut-down takes place (i.e. by progressively shutting down the fuel cell or by gradually reaching from 0 %  $\Rightarrow$  100 % of shut down during the step of shutting-down itself).

With respect to applicant’s arguments against the Dine et al reference, note that it is disclosed that upon an uncontrolled shut-down some of the residual hydrogen and some of the oxygen in their respective anode/cathode flow fields diffuse across the PEM (each to the opposite side of the cell) and react on the catalyst to form water (Dine et al, P0009). Therefore, this implies that the cathode receives water after terminating operation of the fuel cell, and thus, the restoring operation to decrease cathode potential inherently takes place at the cathode. Thus, Dine et al still contemplate the step of carrying out a restoration operation by supplying water to the cathode, that water being the water formed as a result of the residual hydrogen and oxygen reacting together.

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Raymond Alejandro  
Primary Examiner  
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RAYMOND ALEJANDRO  
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